Typology

Greenhouse

Since the 17th century, advances in techniques and technologies have led to a proliferation of greenhouses for mass depletion and empire-building, writes Tom Wilkinson
Seen from the air, vast tracts of the Netherlands and Spain appear blanked out, as if returned to cartographic tabula rasa. This erasure of natural terrain is no act of God: swathed in glass and plastic, respectively, these are the world's most productive vegetable-growing regions, a status they have attained through the proliferation of greenhouses. This development has been hailed as the future of farming, yet it produces mountains of plastic waste and rivers of effluent, squanders enormous quantities of energy and is often staffed by a criminally exploited migrant workforce. By such means are Northern Europe's relatively wealthy people fed on asparagus out of season.

What was once the whim of emperors has become the expectation of the masses. Marlowe's Faustus tells a duchess he will fetch her anything she desires; when she asks for grapes - in the dead of winter, no less - the improbable fruit appear instantaneously, 'by means of a swift spirit'. In the 1590s, Christmas grapes required necromancy; the technology to grow plants beyond their natural habitats and seasons did not arrive until a century later. The first artificially heated greenhouses were built in the UK in the Chelsea Physic Garden in 1681, allowing melons and pineapples to be cultivated in this country for the first time.

This new type of building sprouted from aristocratic luxury, scientific enquiry, technological innovation and capitalism's expansion into the tropics. Physic gardens used to cultivate medicinal herbs had been planted across Europe in the early Renaissance: the universities of Padua, Oxford and Bologna all had examples, and these developed into botanical gardens, where specimens collected by colonisers were returned to the metropole for study with an eye to commercial exploitation. The aristocrats who funded these missions also adopted the type, building gardens in which they could show off their erudition, flaunt their wealth and power by cultivating exotic plants.

The Baroque orangery was an early example of a building used to engineer the climate. At Versailles, Mansart's south-facing garden - the largest orangery in Europe - opens its arms to embrace the sun's rays. It is sheltered by a U-shaped, vaulted structure, glazed along one wall and heated in winter, when the potted fruit trees are taken inside; such spaces, suffused with the scent of blossom, were
The globalised commodity was made to look as if it had grown quite naturally out of the soil

Industrial levels of year-round production have led to high-density greenhouses dependent on manual labour and exploited workforces at El Ejido in Spain (top right) and in the Netherlands, where a worker is binding tomato plants (far right). At a much smaller scale, mobile and low-tech alternatives exist, such as 1+1=2 Architects’ Vegetable Nursery House in Hanoi (below), made of bamboo and 2,000 plastic recycled bottles.

Winter gardens were typically entered directly from the apartments of the house’s owner, making them intimate rooms to which access could only be granted by their possessor. We may therefore read them as an expression of the aristocratic psyche. In Berlin, the Prinz-Albrecht-Palais was remodelled by Schinkel in the 1830s to include a winter garden adjoining the prince’s chambers. He could step from his toilet into a balmy, palm-filled garden, perhaps accompanied by his Black servant August Sabac el Chér, thereby completing the ‘exotic’ atmosphere of his artificial paradise. In the words of Kohlmaier and von Sartori, ‘behind the return to Romanticism was concealed the flight of the nobility from the reality of its loss of political power.’

It was in these years that, across the Channel, the same forces threatening the nobility were preparing to inflate this incipient type to vast dimensions for entirely new publics: the refuge becomes the monster. This development likewise sprang from aristocratic roots. At Chatsworth in 1840, Joseph Paxton completed a huge greenhouse for the Duke of Devonshire, its footprint 90 by 40 metres and with a 20-metre-tall central vault. Here, following the ideas of botanist J.C. Loudon, Paxton jettisoned historicist cladding and the integration of the winter garden with the house, making the greenhouse instead a free-standing object that revolved in the structural possibilities of iron and glass, in its filigree lightness and transparency.

Eleven years later, Paxton used the same ideas to build the Crystal Palace.
When developers bought a patch of land off Highgate High Street in 2012, which had long been occupied by a garden centre, they hoped to build housing on the site. However, locals objected to this proposal and it was eventually rejected by the council. Since then, an uneasy truce has reigned over the so-called Highgate Bowl. In 2017, the developers hired HASA Architects to transform an extant series of six stepped greenhouses into an event space, which the designers have achieved with a light touch and birch plywood panels. In places these obscure the transparency of the original structure, while in others they act as a platform from which to enjoy views of the surrounding gardens that were landscaped at the same time as this intervention was made. Local campaigners fear, however, that this project, and its rather nebulous artistic and charitable programme, is a Trojan horse for the eventual redevelopment of the site.
metros long and 39 metres tall). This contained numerous plants – including several of the park’s mature trees, which determined the height of its vault – but its primary function was the display of commodities from around the world and especially from the empire. In this way, a technology developed for the cultivation of specimens collected by colonisers was transformed into a spectacular display case for the new trades and industries that these early forays had made possible. In the process, the globalised commodity was made to look as if it had grown quite naturally out of the soil.

When the Crystal Palace was moved to Sydenham in 1854, it was returned to a winter garden. But these were no longer the exclusive domain of the aristocracy: ever since the first public winter garden had opened in Regent’s Park in 1846, followed two years later by an example in Paris, the Jardin d’Hiver, the artificial environment was thrown open to what was then termed ‘the masses’, offering welcome respite from northern winters. As warm air and lush foliage, these structures contained every leisure facility imaginable: restaurants, cafés, theatres, picture galleries, billiard rooms, concert halls and so on. The date around which these were built is significant: in the context of the 1848 pan-European social unrest, the erection of public winter gardens has been seen as a counter-revolutionary act, a crystalline opium for the people.

Meanwhile, the new structural techniques behind these buildings, along with advances in heating and ventilation technology, were used to push ‘true’ greenhouses to new heights of specialisation – and excess. Loudon had already experimented with vaulted structures at the start of the type’s development, using curved iron glazing bars; this permitted the abolition of the distinction between walls and roof (Kohlmaier and von Sartori). The result was vast, bulbous jelly-moulds, like the palm houses at Bicton (1820s) and Schönbrunn (1889) and, most extraordinarily of all, the iron-and-glass town – with a church – that Leopold II built at Laeken (1874–95), filled with specimens from his personal Congolese colony. These late examples confirm the idea of the greenhouse as a royal escape pod. Leopold’s 2.5-hectare complex was so extravagant that he was forced to open it to the public to allay criticism.
Office building
Oberhausen, Germany
Kuehn Malvezzi, Atelier Le Balto
and Haas Architekten
2019

An unusual mix of uses determines the split personality of this building in Oberhausen. A five-storey brick volume houses a job centre in a way contrived to fit in with the surrounding historic streetscape of the city's Altmarkt. Meanwhile on the roof sits a saw-toothed structure of galvanised steel, designed in collaboration with greenhouse specialists Haas Architekten, which accommodates a facility for research into architecturally integrated agriculture.

The planting has been incorporated with the help of landscape designers Atelier Le Balto, and spreads throughout this structure and down into the courtyard of the building, carried by an extension of the greenhouse frame, which here becomes a trellis and a stair giving access to the roof. The two halves of the building form, to a certain extent, a metabolic whole, with warm air and greywater from the building being used to encourage the plants growing on its roof.
A floating cuboid pavilion, a glass box filled with opalescent steam, and above it, two barrel vaults of glass bricks: this private greenhouse for tropical plants in Pirque, Chile, unites the alpha and omega of glass architecture. The vaults hark back to Paxton’s Crystal Palace, while the podium refers to the Miesian descendants of the same building. But here the inhabitant is foliage once again, and the greenhouse, displaying its living contents as if in a vitrine, is fitted with automated systems for the maintenance of the kind of warm and humid climate that it requires. In the words of the architect: 'The illusion is of control over nature – something you cannot control.'
‘The erection of public winter gardens has been seen as a counter-revolutionary act, a crystalline opium for the people’

But this was by no means the end of the greenhouse. As we have seen, it led to vast new entertainment structures via the winter garden and, even though these died out around 1900, as the railways gave easier access to the true south, the technology, it has often been asserted, was a direct antecedent of Modernist architecture, of the skyscraper and the shopping mall. (This development has been accompanied by an amplification of the energy expenditure associated with the greenhouse, a problem criticised, in fact, by Paul Scheerbart, who is usually seen as the link between the greenhouse and architectural Modernism.)

This technological teleology has been subjected to political critique by writers like Kohlmaier and von Sartori, and more recently by Douglas Murphy in his books The Architecture of Failure and Last Futures. Murphy argues convincingly that the utopian spark sat at the heart of the winter garden – the dream of the rectified environment in which human and nature could dwell in harmony, the ‘political aesthetic of togetherness’, in his words – turned into the technocratic ‘solutionism’ of British High-Tech, with its baggage of imperial nostalgia.

Indeed, while these accounts tend to describe a parabolic course by which the greenhouse reached an apex of formal austerity and then sank back into Beaux-Arts twiddling, strange feudal aspects have remained embedded in the greenhouse more or less throughout its history, from the ecclesiastical plans of the earliest examples, to the funny little transparent church towers at Berlin Dahlem and the huge coronet that tops the dome at Laeken.

The greenhouse saw a last gasp of utopianism in the ’70s to ’90s, as described by Murphy, when geodesic domes and self-regulating sealed environments, such as Biosphere 2 in Arizona, built in 1991, were advanced as refuges from a corrupted planet, even to the extreme of the orbiting greenhouses proposed by NASA. But the type carries the spores of colonialism and the instrumentalisation of nature even into space. In fact, these spurious dreams did not need to escape gravity to embark on their neocolonial terraforming mission. Aside from doomed attempts at rooftop and vertical farms, the experiment has already begun in Europe, in the infinite space frames of Almeria, which are tended by maltreated workers. These people, of course, do not live in idyllic crystal palaces.
In 2013, a decaying, early 20th-century apartment building in Mexico City was converted into an events space and arts centre. This was a restrained intervention in which the architects shored up the earthquake-damaged structure while leaving its patinated surfaces largely untouched. Last year, local studio Productora covered the three courtyards of the building, which are in great demand with diners, with a 50m-long, pitched greenhouse roof. This structure allows full use of the facilities to take place over during the rainy season, including on the roof itself, which has been provided with a deck and extensive planting. The lightweight, steel and polycarbonate structure adds a contrasting note to the gently mouldering ensemble, lit up at night it forms a beacon shining out over the neighbourhood.
The reality is that human actions require a constant supply of energy, and all forms of energy production, including FVs, have a problematic impact on the environment. (Daniel Knobl)

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